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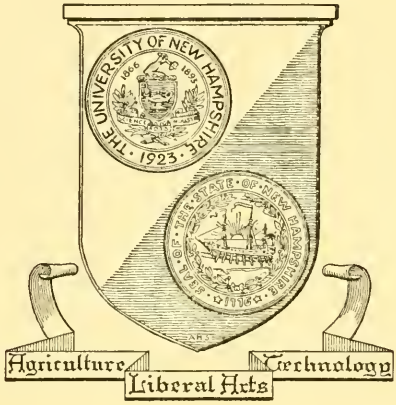

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Bulletin 302 January, 1938

University of New Hampshire
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DAIRY HERD REPLACEMENTS IN SOUTHERN NEW HAMPSHIRE

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Dairy Herd Replacements in Southern New Hampshire

By H. C. Grinnell

The purpose of this study was to procure information on the practices in southern New Hampshire with respect to dairy herd replacements. Survey blanks during the spring of 1933 were filled out by personal visits to 212 farms located in the five southern counties of Cheshire, Hillsborough, Merrimack, Rockingham and Strafford.[1] The records thus acquired were for the year ending April 30, 1933. Of the 212 records taken, exactly 200 were tabulated, the remaining 12 being eliminated for various reasons.

Description of Farms Studied

Size of Farms. Only farms of six or more cows were selected for this survey, and records were not taken in the general farming areas of little or no commercial importance. The farms, therefore, are of larger than average size, but probably well represent the commercial farms of southern New Hampshire. These farms had an average total area of 186 acres per farm, and 53 acres of crops. The average number of cattle units per farm was 22.5, 17.4 of which were cows. The average total investment in land and buildings was $9114 and the cash income per farm was $4292.

Sources of Income. Seventy-six per cent of the average cash income of these farmers was from the sale of dairy products and six per cent from livestock sales. One-half of the farmers received an average of $618 per farm for poultry and eggs, and one-half received an average of $430 for fruits and vegetables. Sixty-four farmers received income from outside sources amounting to $545 per farm. Fifty-four farmers retailed milk, or milk and cream, compared with 141 who sold their milk or cream at wholesale. Five were making butter for regular nearby customers.

Land Use. Only 29 per cent of the total acres operated was in crops in 1933, compared with 50 per cent in pasture and 19 per cent in woods not pastured. Five of the 200 farms had no pasture. The remaining 195 farms had 95 acres per farm, 81 per cent of which was permanent and non-tillable. Sixty per cent of the farmers were using an average of 26 acres per farm of tillable land as permanent pasture. Twenty operators follow the practice of using crop land for pasture, rotating the same in a regular cropping system. The average amount of land used for pasture on the 200 farms was 92 acres which amounted to 5.3 acres per cow or 4.1 acres per cow equivalent (cattle unit) of all livestock. When wooded pasture was reduced to its equivalent of open pasture there were only 1.5 acres of open pasture per cattle unit.

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[1] For details of type of farming in these counties, see New Hampshire Experiment Station Circular 53.

The total area in pasture was 2.8 times its open pasture equivalent. The Merrimack County farmers used large areas for pasture amounting to 144 acres per farm, 2.4 times the area in crops. Eighty-eight per cent was non-tillable. However, this was equivalent to only 29 acres of open pasture, or 1.4 acres per cattle unit, slightly less than the average of all farms. Hillsborough County farmers had only 57 acres of pasture per farm or 1.2 acres of open pasture equivalent per cattle unit. Other counties varied between these two extremes.

Pastures. The carrying capacity of the pastures was only 73 per cent of the total cattle owned. On the other hand, many heifers and dry cows were pastured on rented lands, and many farmers used part of their crop land for green feed to supplement pastures in late season. Meadows were commonly used for grazing in late summer and fall. In Rockingham County, there was a tendency to keep an amount of livestock which would just about utilize available non-tillable pasture land, and then to use any surplus crop land for cash crops.

In general, farmers having more than adequate pasture for their cattle did not have proportionately more heifers, thus indicating that the amount of available pasture was not an important factor in determining the method of herd replacement. There were 46 farms which had 2.3 or more acres of pasture equivalent for each cattle unit pastured (Table 1). These farmers estimated that their pastures were adequate for 12 per cent more cattle than they actually owned. They had proportionately fewer heifers than did those farms with one acre or less of open pasture equivalent for each cattle unit pastured. In this latter group the farmers estimated that their pastures were adequate for only 38 per cent of their cattle, and yet 20.6 per cent of their herds were heifers compared with 18.3 for all farms.

Pasture Supplements. If a pasture were fully used in the spring, it would be over-grazed in the fall by the same number of cattle. For this reason farmers tend to keep more livestock than their pastures will carry throughout the season and then in the later months supplement with other feed. About 80 per cent of the farmers in this survey raised green crops for this purpose, and nearly one-third fed dry roughage. All but six farmers fed grain during all or a part of the pasture season, not in all cases because of failing pastures. The amount of grain fed was 7.1 tons per farm, valued at $197, or 70 per cent of the value per farm of all supplement feeds. Farms which had more than 2.2 acres of open pasture equivalent for each cattle unit pastured fed nearly as much grain, but less than one-fourth as much of roughage and green feeds, as those farms which had one acre or less. There was no general tendency for farmers having more pasture to feed less grain, thus indicating the common practice of feeding grain throughout the year.

THE DAIRY HERDS

For each farm a detailed inventory at the beginning and end of the year and a record of all purchases and of all sales of stock were obtained for each kind of dairy cattle including milk cows, heifers one year old and over, heifers less than one year old, herd bulls and bull calves. A record was also obtained of deaths. Each kind of livestock was classed

TABLE 1. *Relation of acres of pasture equivalent per cattle unit pastured to carrying capacity of pastures and per cent of cattle units heifers.*

Acres of pasture equivalent per cattle unit pastured	Number of farms	Acres of pasture equivalent		Cattle units pastured in per cent of total cattle units	Estimated capacity of pastures in per cent of cattle owned	Per cent of cattle units heifers
		Per farm	Per cattle unit pastured			
1.0 or less	43	11.5	0.6	78	38	20.6
1.1 to 1.6	54	27.2	1.3	85	68	16.6
1.7 to 2.2	57	33.7	1.9	83	76	17.8
2.3 or more	46	58.5	3.4	84	112	18.6
All farms	200	32.9	1.8	83	73	18.3

into two groups, purebred and grade, and then subdivided according to whether purchased or raised. Estimated values were attached to each item. Farmers were requested to base all values at the beginning of the year on prices prevailing at the end of the year, thereby eliminating any variation due to price fluctuations. A summary of the detailed inventories appears in the appendix. Cattle appreciation amounted to $153 per farm. Appreciation occurred under average conditions for all groups of farms on which heifers comprised ten per cent or more of the total cattle units. Thirty-eight farms on which heifers comprised less than 10 per cent of the total cattle units showed an average depreciation of $55 per farm. The average investment in dairy cattle, and cattle sales tended to increase with a proportionate increase in the number of heifers, whereas purchases tended to decline.

Of the 200 herds, 116 or 58 per cent were predominantly Holsteins. There were 16 Ayrshire herds, 38 Guernsey, eight Jersey, and four dual-purpose herds. In 18 herds which are classed as mixed there was no predominant breed and three-fifths of the cows were purchased, compared with two-fifths or less for the other groups. Rockingham was the only county in which more than one-half of the cows were purchased.

Additions to Milking Herd. During the year, 373 replacements were purchased, nearly three-fourths of which were grades. The average price paid was $77 per head, $71 for grades and $95 for purebreds. But the number of replacements by purchase amounted to only slightly more than one-third of all the additions, the remainder being by first-calf heifers, practically all of which were born and raised on the respective farms. Approximately three out of every 10 cows inventoried on April 30, 1933, were added during the year, 10.4 per cent of the total by purchase and 19.8 per cent by first-calf heifers.

Retail dairies added a larger proportion of their herds than did wholesale dairies, but tended to purchase rather than raise them. On those farms located more than two miles from an improved highway, only 1.4 per cent of the herd was added during the year by purchase and 24.6

per cent by raising first-calf heifers. Only 26 per cent of the cows on hand at the end of the year had been added during the year compared with over 30 per cent on farms more advantageously situated.

There is no consistency in the relation between the ratio of crop to pasture land and the method of adding new cows to the herd to replace those sold or otherwise eliminated, or to increase the size of the herd. Thirty farms which had less than one acre of crops for each acre of open pasture equivalent had added only 4.6 per cent of their ending inventory by purchase and 21.8 per cent by first-calf heifers (Table 2). But 51 farms, which apparently had too little pasture, having had three acres or more of crop land to one of pasture, had added only 7.5 per cent of their ending inventory by purchase, which is much less than was the case on farms with 1.0 to 2.9 acres of crop land per acre of pasture. Thus it is not the rule on these farms that greater amounts of pasture in proportion to crop land are accompanied by more young stock.

Cow Sales. There was a total of 4450 cows handled during the year, of which 802 or 18 per cent were sold (Table 3). This amounts to about one-fourth of those on hand at the beginning of the year. Slightly less than one-half of all those sold were slaughtered, supposedly because they were considered no longer profitable. The others were sold to farmers, or to dealers to be resold to farmers, as cows worthy of being retained for productive purposes. Of those cows which were raised on the respective farms where inventoried, 15.6 per cent were sold, compared with 22.1 per cent of those which had been purchased.

The average price received was $67 per head for cows sold for production and $28 for those slaughtered. The average price received for cows sold for production was $10 less than that paid for cows purchased, this difference being mainly due to high prices paid for out-of-state cows. Grade cows that were raised on the farm and then sold brought $4 more per head than those purchased and resold, compared with a difference of $15 more in the case of purebreds.

Those herds in which no breed predominated sold 26 per cent of the total cows handled. More than three-fifths of these were sold for production. This is inconsistent with the fact that there are no breeders of purebred cattle among owners of mixed herds, and with the fact that proportionately more replacements are purchased than in the case of other herds.

Fifty-four farms selling their milk and cream at retail sold nearly as many cows proportionately as farmers who were selling at wholesale. It is noteworthy that retail farmers sold 7.8 per cent of their cows for production compared with 9.9 per cent for wholesale farmers, a difference of only 2.1 per cent. Some of these sales were an exchange for fresh cows necessitated by a temporary shortage of milk. Many of these farmers who were so advantageously located as to have a retail milk market were not equally fortunate in being able to sell their entire production at the higher price during all seasons. Thus they found it more to their advantage to raise young stock than to produce a surplus of milk beyond what is required for their regular or seasonal trade and for which there is no ready market. Furthermore, skim milk affords a cheap source of food for young heifers on the retail farms which

TABLE 2. *Relation of balance between crop land and pasture land to the number of cows added during the year, with percentages.*

Ratio of crop land to pasture equivalent	Number of farms	Number of cows on hand at end of year	Number of additions to herd			Per cent of herd added during year		
			Total	By cows purchased	By first-calf heifers	Total	By cows purchased	By first-calf heifers
Less than 1	30	559	145	25	120	26.4	4.6	21.8
1 to 1.9	72	1,428	440	182	258	30.8	12.7	18.1
2 to 2.9	47	788	257	104	153	32.6	13.2	19.4
3 and over	51	826	242	62	180	29.3	7.5	21.8
All farms	200	3,592	1,084	373	711	30.2	10.4	19.8

TABLE 3. *Number of cows handled and the number sold for production and for slaughter, with percentages, according to whether raised or purchased.*

Cows	Total number of cows handled during year	Cows sold for production		Cows sold for slaughter		All cows sold	
		Number	Per cent of cows handled	Number	Per cent of cows handled	Number	Per cent of cows handled
Raised	2,805*	231	8.2	208	7.4	439	15.6
Purchased	1,645†	183	11.1	180	11.0	363	22.1
Totals	4,450	414	9.3	388	8.7	802	18.0
Per cent		51.6		48.4		100.0	

* Beginning inventory plus heifers freshened during year.
† Beginning inventory plus cows purchased during year.

sell cream as well as milk. Twenty-six per cent raised heifers beyond the number necessary for maintaining the herd, and thereby established an income-producing enterprise in addition to that of milk production. Only twenty per cent of the wholesale farmers were raising heifers beyond maintenance requirements.

A total of 56 cows died during the year. Based on the total number of cows handled, 4450, the mortality rate was 1.26 per cent.

Adequacy of Heifers for Maintenance. The 200 farms surveyed were virtually self-supporting with respect to the number of heifers required for replacements, based on all cows eliminated and the average age at which heifers freshened. In order to replace the 858 cows disposed of during the year by sale and by death, it would require 2166 heifers of all ages, if freshening at average age of 30.3 months

Table 4. *Adequacy of the number of heifers on hand April 30, 1933 to replace cows eliminated during the year, by counties.*

	County					
	Cheshire	Hillsborough	Merrimack	Rockingham	Strafford	All Counties
Number of farms	46	47	42	35	30	200
Number of cows:						
Sold for production	207	43	58	60	46	414
Sold for slaughter	65	102	87	78	56	388
Died	16	8	16	10	6	56
Total eliminated or to be replaced	288	153	161	148	108	858
Average age of heifers at first freshening (months)*	30.2	29.6	31.1	30.0	30.7	30.3
Number of heifers required for replacement	725	378	417	370	276	2,166
Number of heifers on hand April 30, 1933	693	364	555	229	320	2,161
Number of heifers in excess of requirements†	–32	–14	138	–141	44	–5
Percentage excess†	–4.4	–3.7	33.1	–38.1	15.9	–0.2

* Concerns 190 farms.
† Minus sign denotes deficiency.

Table 4). The number of heifers of all ages inventoried at the end of the year came short only five, less than one-fourth of one per cent of being adequate to replace all the cows disposed of. Rockingham County was deficient 141 heifers compared with an excess of 138 in Merrimack County, the percentage deficiency and excess amounting to 38.1 and 33.1 respectively.

Those herds in which the Holstein breed was predominant, and also Jersey herds, were nearly adequately supplied with heifers, whereas the Ayrshire, Guernsey and dual purpose herds had approximately a 50 per cent excess of heifers. Mixed herds which, as was shown previously, consisted mainly of purchased cows and had the least number of heifers in proportion to the number of cows, had approximately one-half as many heifers as would be required for replacements.

There were 81 herds which consisted entirely of grade cows and 25 which consisted only of purebred cows, all others having both grades and purebreds. The average age at which heifers freshened was 2.2 months greater for grade herds than for purebreds. Grade herds were short 91 heifers of having enough to replace all cows eliminated during the year, compared with an excess of 47 for purebred herds, the percentage deficiency and excess amounting to 11.2 and 15.1 respectively. The 94 farms on which the herds consisted of both grade and purebred cows had only a slight excess of heifers.

There was an excess of 66 heifers or 11.9 per cent of the number required for maintenance on the 54 retail farms. Wholesale milk farms lacked 91 of having enough heifers to replace all the cows disposed of during the year. The five farmers who made butter had sold only four cows and had 30 heifers on hand at the end of the year, three times the 10 required based on the average freshening age of 30 months.

Replacement Practices

Virtually sixty-three per cent of the cows on hand April 30, 1933, were raised on the respective farms where inventoried. Only six of the 200 farmers had adopted the practice of purchasing all replacements. All others were raising one or more heifers, and 45 stated that they were raising heifers beyond replacement needs or in other words as an income-producing enterprise in addition to that of milk production. Sixty-six farmers or 33 per cent stated that they were raising proportionately more heifers than formerly, and five that they were planning to raise more of their replacements in the future.

Raising Heifers. There were 60.1 heifers for each 100 cows owned, or virtually three heifers for each five cows. It is an apparent fact that raising dairy herd replacements is quite generally practiced in southern New Hampshire, irrespective of some factors such as type of business, location, amount of pasture and distance from hard road, which might conceivably be of importance in otherwise effecting a better balanced farm business. Although these factors show some relation to the number of heifers per 100 cows, and to the per cent of cows raised, the dependence is not significant and is commonly inconsistent.

Why Farmers Raise Replacements. Each farmer was required to state just why he raised his replacements instead of buying them. In virtually every case, the farmer stated that, under current cow prices, he thought it was at least as cheap to buy a cow as to raise one, and then gave one or more of three reasons why he preferred to raise his own replacements. The first and the one most frequently mentioned was that the expense was less noticeable; by raising heifers the feed was mainly home-grown and the grain could be purchased in small amounts, whereas, if it were necessary to buy a cow, the money was not always at hand and the purchase was too frequently postponed, thus reducing current income.

A second reason was that they knew what they were getting; in many instances purchased cows did not possess qualities commensurate with the price paid. By raising heifers there was a greater opportunity to build up a good herd as a result of a breeding program.

Thirdly, farmers quite generally agreed that disease was less likely when replacements were raised. Many felt from the results of the tuberculin test, that this disease was introduced into the herd by cows purchased from other herds. Other diseases frequently mentioned were contagious abortion and mastitis.

Practices and Feed Costs. No attempt was made in this survey to obtain the total costs of raising heifers. However, careful consideration was given to feed costs exclusive of pasture, and to the practices

employed. Such data was obtained for 190 farms and represents how the average heifer was raised on each farm for the year surveyed. Feed costs ordinarily represent about two-thirds of the total costs, the actual percentage, of course, depending on current price relationships between the cost factors. Costs other than feed include labor, pasture, bedding, use of buildings and equipment, interest and miscellaneous.

Ninety-three of the 190 farmers rented outside pasture for young stock; and in some instances when the pasture was near, both young stock and dry cows were pastured off the farm. Many of these pastures were 10 to 20 or more miles distant. The cash rent ranged from $2 to $12.50 per cattle unit pastured and averaged $4.94 per cattle unit for the 93 farms.

The average heifer on these 190 farms was raised in accordance with the following plan. The calf was weaned at eight days of age and then barn fed or more frequently fed in a paddock until it had attained the age of about 10 months before being turned out to pasture. Freshening at the average age of approximately 2.5 years enabled the heifer to utilize pasture for two full seasons, or 328 days out of the 921 total heifer days. Thus 36 per cent of her time was spent on pasture.

Nearly all farmers, 185, fed whole milk for an average period of 45 days (Table 5). Although this was mainly surplus milk for which a low price would otherwise have been received, relatively large amounts of high priced milk were used on some farms. The entire amount of 515 pounds was valued at $1.76 per hundredweight. Of 55 farms more than 1.5 tons of skim milk were fed to the average heifer over a period of 169 days. For 28 of these farms no value was assigned to the skim milk because the operators stated that this by-product had no sale value under their conditions and would have been thrown away had it not been consumed by heifers. Another group of farmers, 77, bought dried skim milk, which was fed over an average period of 125 days. The cash cost of the 176 pounds of dried skim milk was nearly 2.5 times as much as the average sale value of 3040 pounds of fresh skim milk. Four farmers fed no grain, whereas all others fed some form of concentrated feed for an average of 486 days, more than four-fifths of all the time the heifer was barn fed. Succulents, including both green feed and silage, were consumed by heifers on 122 farms. Green feeds such as millet, oats and corn fodder were frequently used to supplement pastures during the latter part of the season where heifers were pastured near home. Dry roughage was fed during the barn feeding periods on all farms for an average period of 556 days, apparently having begun feeding small amounts at an average age of 37 days. Dry roughage accounted for more than one-half the total cost of raising an average heifer on the 190 farms, and dry roughage and succulents for nearly two-thirds. Other feeds, of which concentrates and whole milk made up the greater portion, amounted to about one-third. The total feed costs exclusive of pasture to raise an average heifer to the age of freshening, 30.3 months, was virtually $67. This total cost was only $10 less than the average price paid for all cows purchased during the year and only $4 less than the average price paid for 271 grade cows. On the basis of feed costs, all costs would approximate $100 per heifer. Thus, for the year in question, the purchase price of cows was less than the total costs

TABLE 5. *Kinds of feed consumed by heifers on 190 farms, and the amount and value of each.*

Kind of Feed	Number of farms feeding	Average for farms feeding			Average for all farms		Per cent of total value of feed
		Number of days fed	Total pounds fed	Value of feed consumed	Total pounds fed	Value of feed consumed	
Whole milk	185	45	515	$9.06	502	$8.82	13.2
Skim milk*	55	169	3,040	2.94	880	.85	1.3
Dried skim	77	125	176	7.00	71	2.84	4.2
Concentrates	186	486	795	10.62	779	10.40	15.5
Succulents	122	376	4,802	12.04	3,084	7.73	11.5
Dry roughage	190	556	5,392	36.34	5,392	36.34	54.3
All feeds	190	X	X	$66.98	X	$66.98	100.0

* No value was assigned to skim milk in those instances where it otherwise would have been wasted.

of raising heifers. On the other hand, the cash costs were less, thus giving some justification to the farmers' reasoning that the costs were less noticeable.

The relation of various factors to feed costs of raising heifers does not take into consideration differences in quality and kind of feeds consumed or in quality of heifers raised. Variations in length of pasture season measure differences in practices and cannot generally be accounted for by climatic factors within a relatively small area. They may or may not be a matter of pasture quality. It is possible that those farmers who started barn feeding earlier in the fall were able to attain a more desired quality of heifer. This and other factors are shown here merely as a matter of their relation to feed costs and their interrelationships to each other, and are not to be interpreted as recommended practices.

Heifers born during the autumn months or in early winter were, in most cases, turned out to pasture during the entire first pasture season. Many of these heifers first freshened at an age of over 30 months and were therefore pastured for three, or nearly three, entire pasture seasons. In these instances, the age at first freshening was not a factor in correspondingly increasing the feed costs exclusive of pasture. On 44 farms the average heifer was turned out to pasture at seven months or less of age and during the total heifer days was pastured an average of 392 days which is more than the equivalent of two pasture seasons of 168 days each (Table 6). On these farms the average heifer freshened one month older than on farms where heifers were not turned out to pasture until 12 or more months of age. However, in view of the fact that the earlier pastured heifers utilized pasture for nearly two months in their third year, the extra month of heifer days did not have an im-

portant effect on feed costs. Heifers not pastured until they were 12 months or more of age were not on the average pastured for two full seasons. A heifer turned out to pasture at the age of more than one year would have to freshen at the advanced age of more than three years in order to utilize pasture for two entire seasons. In such cases a few extra months of barn feeding beyond the age of about 2.5 years materially affected feed costs. The average feed costs for farms where heifers were pastured at seven months or less were $8.29 per heifer less than on farms where heifers were not turned out to pasture until they had attained the age of 12 or more months. This difference was not due to freshening at a younger age, but rather to less barn feeding and a greater proportion of their time being spent on pasture, a relationship which follows.

On 42 farms where the average heifers spent more than 40 per cent of their total heifer days on pasture, the feed costs to the day of freshen-

Table 6. *Relation of age when first turned to pasture to feed costs of raising an average heifer, and other factors.*

Age when first turned to pasture	Number of farms	Average age when first turned out to pasture	Average total number of heifer days on pasture	Average length of pasture season	Average age at first freshening	Average per cent of days on pasture	Average feed costs of raising to day of freshening
		Months		Days	Months		
7 months and less	44	6.2	392	168	30.9	41.6	$62.87
8 to 11 months	73	9.0	337	163	30.3	36.6	65.27
12 months and over	73	12.4	286	163	29.9	31.2	71.16
All farms	190	9.7	330	164	30.3	35.7	$66.98

ing averaged approximately $12 per heifer less than for the average heifers on 36 farms where 30 per cent or less of their time was spent on pasture (Table 7). Feed costs for the latter group of farms were not higher because heifers were kept longer before freshening, for in fact they freshened on an average of 2.2 months younger, but were mainly due to a proportionately small amount of time spent on pasture as a result of older age at time of first pasturing and a shorter pasture season. Thus an increase in the per cent of total heifer days that were spent on pasture was associated with an increase in the total number of pasture days and in the length of pasture season, and a decline in the age at first pasturing, and in feed costs.

On 51 farms where the average heifer freshened at less than 30 months of age the feed costs of raising them averaged approximately $14 less than for those raised on 59 farms where they freshened at more than 30 months of age (Table 8). Although there was no significant difference in the average age at which they were turned out to pasture, the former group lacked on an average 44 days of utilizing two full pasture seasons. Those which freshened at 30 months of age lacked 13 days, and those

which freshened at more than 30 months of age utilized pasture for 59 days in the third season. The average per cent of total heifer days that were spent on pasture tended to increase somewhat with age of freshening.

The per cent of herd purebred had no significant effect on the feed costs of raising heifers.

The 45 farmers who were raising cows for sale as well as for replacements were raising heifers at an average feed cost of approximately $5 less than those who were raising only for replacements. This is in view of the fact that heifers from the former group of farms were first turned out to pasture at an average of 1.2 months older age. There was no sig-

TABLE 7. *Relation of per cent of total heifer days spent on pasture to feed costs of raising a heifer, and other factors.*

Per cent of heifer days on pasture	Number of farms	Average per cent of days on pasture	Average total number of heifer days on pasture	Average age at which first turned to pasture	Average length of pasture season	Average age at first freshening	Average feed costs of raising to day of freshening
30 and less	36	25.9	231	11.9	151	28.9	$73.21
31 to 35	48	33.2	311	10.7	161	31.0	68.65
36 to 40	64	37.9	346	9.4	168	30.1	65.93
More than 40	42	43.5	412	7.1	175	31.1	61.33
All farms	190	35.7	330	9.7	164	30.3	$66.98

TABLE 8. *Relation of age at first freshening to feed costs of raising a heifer, and other factors.*

Months from date of birth to date of first freshening	Number of farms	Average age at first freshening	Average number of heifer days on pasture	Average age when first turned to pasture	Average length of pasture season	Average per cent of days on pasture	Average feed costs of raising to age of freshening
		Months		Months	Days		
23 to 29	51	25.7	268	9.6	156	34.3	$58.73
30	80	30.0	321	10.1	167	35.3	68.07
31 to 36	59	34.7	395	9.2	168	37.4	72.63
All farms	190	30.3	330	9.7	164	35.7	$66.98

nificant difference between the two groups with respect to average length of pasture season, average age at first freshening or average per cent of total heifer days spent on pasture. Some of the difference in feed costs can be accounted for by the fact that this group included 21 of the 55 farms which had fresh skim milk to feed and 11 of the 28 farms feeding

skim milk to which no value was attached. Proportionately these are about twice as many.

Comparison of 10 *Highest Feed Cost Farms with* 10 *Lowest.* The object of this comparison is not a matter of recommended practices but rather to account for extreme variations in feed costs and how they were brought about. Here again, differences in quality of feeds and quality of heifers are not given due consideration.

The average feed costs amounted to $37.10 for the low cost farms and $111.63 for the high cost farms, the latter amounting to approximately 300 per cent of the former. The high feed cost farms had proportionately more tillage land and more crop land per acre of open pasture equivalent. Pastures on the low cost farms were utilized approximately at their carrying capacity, whereas on the high cost farms the cattle pastured amounted to 169 per cent of the carrying capacity. Calves nursed more than twice as long on the high cost farms and averaged three months older when turned out to pasture. Although heifers on the low feed cost farms were on the average six months younger at the time of first freshening, they availed themselves of a longer pasture season and spent fully as many total heifer days on pasture. The average per cent of total heifer days on pasture was 40.3 for the low cost farms and 32.5 per cent for the high cost farms. Thus the high feed cost farms, on the average, barn fed their heifers for more than six months longer than the low cost farms, and at least two months of this after they were two years old when they would consume nearly as much as a mature cow.

With the exception of fresh skim milk, which was only of nominal value, the high feed cost farms fed each kind of feed over a longer period, fed more per day and in the case of whole milk and dry roughage they fed a higher valued product (Table 9). Average heifers on the low cost farms were raised mainly on dry roughage feed which was valued at 66 per cent of the total feed costs compared with only 44 per cent for the high cost farms. Concentrates amounted to about 11 and 22 per cent respectively of the total feed costs. Whole milk and concentrates together amounted to 41 per cent of the average total feed costs on the high cost farms compared with 19 per cent on the low cost farms.

Purchasing Cows

It has been previously stated that one of the main reasons given by farmers for raising replacements was that they knew what they were getting. If farmers could purchase cows with some degree of surety that such cows would not be misrepresented, to the end that a larger percentage of their purchases would be satisfactory in their own estimation, undoubtedly many could gain by buying replacements rather than raising them.

All farmers questioned were asked to give their estimate of how many good cows they could expect to get from each 10 purchased and how many from each 10 raised to date of freshening. No answer was obtained from those who had not had adequate experience in either case to express an opinion. A summary of these opinions indicates that 60 per cent of the cows bought and 71 per cent of those raised would be

satisfactory additions to a farmer's herd. This advantage could well prevail under existing conditions of purchasing replacements. Probably of greater importance is the possibility of spreading disease which was not taken into consideration in these estimates.

TABLE 9. *Kinds, amounts, and values of feed consumed by the average heifer on the 10 lowest and 10 highest feed cost farms.*

Kind of feed	Ten lowest feed cost farms				
	Number of farms feeding	Average per farm feeding			Average value of feed 10 farms
		Days fed	Pounds fed	Value of feed	
Whole milk	10	20	204	$3.05	$3.05
Skim milk	4	168	2,382	.92	.37
Dried skim	3	85	85	3.78	1.13
Concentrates	10	256	283	4.01	4.01
Succulents	5	320	3,233	8.08	4.04
Dry roughage	10	450	4,384	24.50	24.50
Totals	10	789	X	$37.10	$37.10

Kind of feed	Ten highest feed cost farms				
	Number of farms feeding	Average per farm feeding			Average value of feed 10 farms
		Days fed	Pounds fed	Value of feed	
Whole milk	10	81	1,191	$20.86	$20.86
Skim milk	1	122	1,220	0.00	0.00
Dried skim	3	172	343	15.45	4.64
Concentrates	10	678	2,093	24.92	24.92
Succulents	8	456	6,044	15.08	12.07
Dry roughage	10	660	7,057	49.15	49.15
Totals	10	972	X	$111.63	$111.63

Some Purchased Cows. An attempt was made to obtain some detailed information concerning the cows purchased during the year. Many of these cows had not been owned long enough for farmers to form much of an opinion. Approximately three-fourths were purchased locally, mostly within the same or neighboring town. One-half were bought from farmers and one-fourth from dealers, most of whom were merely engaged in local trading. Although a larger proportion of those purchased from dealers were grades than in the case of those bought from local farmers, the average price paid was $4 per head more. An average price of $111 per head was paid for 68 cows purchased from out of

the state, 47 of which were purebreds. These cows originated from Wisconsin, Vermont, Canada and Massachusetts. Only two of the cows purchased from out of the state were low producers or proved to be otherwise unsatisfactory, compared with one out of every 10 cows bought locally. Dissatisfactions over cows purchased from local dealers were proportionately greater than in the case of cows purchased from local farmers. Low production was the most frequent complaint and udder trouble next. Only two cows were found to possess udder defects immediately following the time of purchase, but eight others developed it before the end of the period covered by this survey. Other dissatisfactions were failure to breed, low test milk, bad temperament and lameness. Only eight of the 261 cows were known to be blood tested for Bang's disease before purchase.

Quality of Cows Being Sold. Detailed information was obtained for each cow sold for the purpose of evaluating it in terms of its qualifications for the purpose for which it was sold, and to determine as far as possible the better sources of good cows for those who might find it to their economic advantage to purchase replacements. Because of the nature of the questions the records were critically scrutinized and many discarded because of omissions and obvious inconsistencies. Separate tabulations for each cow sold were then made of the remaining records which included 297 of the 388 cows sold for slaughter and 375 of the 414 sold for production.

Each farmer was requested to give for each cow sold the main reason why he disposed of her. It is to be assumed that these reasons do not over-emphasize the sale of poor quality cows for productive purposes but more likely underestimate it. Each cow sold for production was classified on the basis of these reasons according to whether or not the reasons suggested that she was worthy of being retained for continued production. It is recognized that any sale for good reason might also be a matter of culling because the seller in many cases would dispose of his poorest cows. However, there is nothing contained in the good reasons which would suggest that a cow was being misrepresented or unjustly sold as a producer.

On the basis of this classification only 62 per cent of the 375 cows sold for production were sold for good reason (Table 10). This agrees fairly well with the farmers' estimate that 60 per cent of all purchased cows were satisfactory. Ninety-three per cent of those sold by farmers who make it a part of their business to raise cows to sell were apparently rightly sold compared with only 40 per cent for farmers who raise heifers only for replacements. The average price received was $15 greater for the former group, at least partially accounted for by the fact that 36 per cent were purebreds compared with only 22 per cent for those who raise heifers only for replacements, and partially because they were better cows and make better sales. Cows sold from farms where they raised them for the purpose of sale in addition to replacements were more than one year younger; they had a longer lactation period, and production was apparently somewhat greater than cows sold from herds supplied with fewer young heifers. The final appraisal cannot rest with factors which concern the last lactation period. Many

TABLE 10. *An appraisal of cows sold for production according to purpose of raising heifers.*

Purpose of raising heifers	Number of cows sold	Per cent raised	Per cent purebred	Average price received	Average age	Average period dry	Average maximum one day's production†	Per cent sold to farmers	Per cent sold for good reason
				Dollars	Years	Days	Pounds		
For income in addition to replacements	160	87	36	77	5.5	57	40	48	93
For replacements only*	215	38	22	62	6.6	62	36	46	40
All farms	375	59	28	69	6.1	59	38	47	62

* Includes three cows sold by farmers who purchase all replacements.
† Production per day at about 30 days after freshening.

cows may have been heavy producers but because of some defect, which would soon make them unprofitable, they were disposed of for continued production when they should have been slaughtered.

Cows sold for production from herds of which 10 per cent or less were raised were all cows which had been purchased into the herd and only five or 15 per cent of the 33 so disposed of were sold for reasons classed as good (Table 11). Two-thirds were sold direct to farmers. On the average, these cows had reached the age at which rapid depreciation usually begins; they were dry for an average of two and one-half months and were usually low producers. On the other hand, 93 per cent of the cows sold from farms on which cows raised comprised over 90 per cent of the herd, were sold for good reasons. Nearly three-fifths of these were sold to dealers. There is every indication that better cows can be

TABLE 11. *Appraisal of cows sold for production according to the per cent of the respective herds that were raised.*

Per cent of herd raised	Number of cows sold	Per cent raised	Per cent purebred	Average price received	Average age	Average period dry	Average maximum one-day's production	Per cent sold to farmers	Per cent sold for good reason
				Dollars	Years	Days	Pounds		
10 and less	33	0	24	65	7.6	73	30	67	15
11 to 50	89	24	31	62	5.5	54	39	44	30
51 to 90	133	74	27	70	5.7	60	38	50	68
91 to 100	120	85	28	73	6.6	59	40	42	93
All herds	375	59	28	69	6.1	59	38	47	62

purchased from herds which are mainly raised on the respective farms from which sold and which are selling mostly cows, than from herds which are mainly purchased and whose sales are mostly cows that are purchased and resold.

It is not only important that cows be purchased from herds which are predominantly raised but also that the individual cow be raised on the farm from which she is purchased. Although there is no significant evidence that the cows raised are of superior quality to those purchased, with respect to age, length of lactation period and production, a much larger proportion of those purchased and resold were obviously disposed of for questionable reasons. Seventy-nine per cent of the cows raised were sold for good reasons compared with only 39 per cent of those purchased and resold.

In general a dairyman's chances of getting a good cow were better with purebreds than with grades, especially when purchasing from a purebred herd. Eighty-one per cent of the cows sold from herds which consist only of purebreds were sold for good reasons, even though 44 per cent of these cows were purchased and resold. The average price received for cows sold from purebred herds was much higher than for those sold from other herds, but the average production was also higher. Only 23 per cent were sold to dealers. Three-fifths of all the purebred cows sold for production were sold from purebred herds. Thus, most of those disposed of from herds which were partly grade and partly purebred were grade cows, and it is from these grade herds, especially those which were mainly grade but consisting of one or more purebreds, that a large proportion of the sales was questionable.

In general, higher prices received were commensurate with better quality cows. Cows for which above average price was received averaged higher production and were somewhat younger, and a much larger proportion of them was sold for good reason. Cows sold from herds which consisted mainly of mongrels or of several breeds with none predominating were mostly cows purchased and resold. They were older, average production was low, and approximately three-fourths were sold for reasons which make their ownership questionable. Only 13 per cent of the mongrel cows were sold for good reasons compared with 68 per cent for the regular breeds. Only 31 per cent were raised, and these averaged more than one year older, had a shorter lactation period, and were on the average low producers. Sixty-seven per cent were sold to farmers. There is no evidence that cows sold for continued production by farmers who sell their dairy products at retail are of any better or poorer quality than those sold by wholesale farmers. Proportionately more were raised by the farmers selling them, and even though a larger percentage was purebred, the price averaged $4 per head less than those sold by wholesale farmers.

There is apparently some tendency for farmers to sell a larger proportion of their imperfect cows to dealers than to farmers. Sixty-seven per cent of those sold to farmers were sold for good reason compared with 58 per cent of those sold to dealers. An average price received from dealers was $6 per head less and a smaller proportion was purebred.

When dairy cows are found to be inefficient producers of milk or have depreciated because of age or some ailment, they should be sold for

slaughter purposes and not to other farmers or to cattle dealers for continued production to obtain a more attractive price. It would seem, then, that cows sold for slaughter should fall into a different category from those sold for production, and yet some of the reasons for selling are common to both groups but differ in times mentioned. Breeding and calving troubles accounted for more than one-fourth of the 297 cows slaughtered for which detailed information was tabulated. The greater part of this was of the nature of Bang's disease. Only one-fifth were slaughtered because of old age. Udder trouble accounted for 17.5 per cent of the cows slaughtered, usually taking the form of one or more defective quarters. Undoubtedly the greater part of this was mastitis. Only 25 per cent of the cows slaughtered because of udder trouble were purchased cows, compared with 49 per cent of those sold because of breeding and calving troubles. Thus, proportionately more of the raised cows were sold because of udder trouble and proportionately more of the purchased cows were sold because of breeding trouble. Only 17 cows were said to be slaughtered because of culling out.

About as large a proportion of the cows sold for slaughter was raised on the respective farms as in the case of those sold for production. Thirty-two per cent of those slaughtered were purebreds compared with 28 per cent of those sold for production. Slaughtered cows averaged more than one year older, and although they attained the same maximum production about 30 days after freshening, they had on the average a shorter lactation period. In general slaughtered cows were of poorer quality but perhaps to a lesser degree than might be expected.

Disease and Replacement Practices

Another important reason given by farmers for raising their own replacements was that it is easier to keep the herd free from contagious diseases. The three diseases most prevalent among dairy cows in the northeast are bovine tuberculosis, Bang's disease or contagious abortion, and mastitis.

The Tuberculin Test. Although bovine tuberculosis was practically eradicated from New Hampshire herds before the period of this survey, some information was obtained for general knowledge concerning the results of the test, and for the purpose of observing the relation of replacement methods to the prevalence of this contagious disease. These data were employable for 164 of the 200 herds surveyed, and included 2837 cows tested (Table 12). Fifty-nine per cent of these cows were raised on the respective farms where tested. Forty per cent of all the cows tested were classed as reactors for which state and federal indemnity has been available since 1917. Proportionately more of the purchased cows reacted than of those raised, the percentages being 54 and 29 respectively. In general, losses declined with an increase in the per cent of the herd that was raised. More than two-thirds of the 51 herds which consisted only of cows raised proved to be free of tuberculosis; whereas, in the case of herds which were partly raised and partly purchased, only a small percentage was clean.

There was a tendency for herds tested in the later years to involve greater losses (Table 13). This trend is associated with replacement

methods. The percentage of cows raised that reacted to the test tended to increase more with the advance of years than did the per cent of cows purchased. Proportionately more of the cows tested in the earlier years

Table 12. *Results of tuberculin test, according to the percentage of the herd that was raised on the respective farms where tested.*

Per cent of herd raised	Number of farms	Number of cows tested	Per cent of cows raised	Reactors		Per cent of cows raised that reacted	Per cent of purchased cows that reacted	Per cent of herds having no reactors
				Total number	Per cent of cows tested			
None*	22	375	0	183	49	X	49	27
1 to 49	41	811	31	417	51	39	57	10
50 to 99	50	939	75	413	44	39	58	26
100	51	712	100	110	15	15	X	69
All herds	164	2,837	59	1,123	40	29	54	35

* Some of these herds were purchased in entirety at some time previous to test and were purchased as clean herds. The results are therefore not comparable with other groups. In ordinary practice it was customary for most of this group to raise their replacements.

were raised. Of the 36 herds tested before 1925, 71 per cent of the cows were raised and only 22 per cent reacted. Cows raised constituted only 46 per cent of the herds tested after 1930 and 37 per cent reacted. Thus it would appear that farmers by delaying the test suffered greater losses among cows raised and that losses among purchased cows were approximately the same regardless of whether or not the test was delayed.

The per cent of cows purchased is also an important factor in accounting for difference in severity of losses between counties. Rockingham and Merrimack Counties afford the two extremes. Only 44 per cent of the cows tested in Rockingham County were raised and 50 per cent were reactors. The losses among cows raised were much greater than for any other county. In Merrimack County where nearly three-fourths of the cows were raised, the reactors amounted to only 33 per cent of the cows tested, and only 22 per cent of cows raised reacted, but the losses among purchased cows were much greater than for other counties.

Greater losses were undergone among mixed herds than in those herds which predominated in some breed. More than two-thirds of the cows in mixed herds were reactors, 57 per cent of the cows raised and 80 per cent of those purchased. This heavy loss is associated with a comparatively large percentage of purchased cows. Next to mixed herds those which were predominantly Holstein consisting of only 55 per cent of cows raised had a 42 per cent loss from the test, much higher than for other breeds. Four dual purpose herds in which only eight per cent of the cows were purchased all passed a clean test.

TABLE 13. *Results of tuberculin test, according to period within which the test was conducted.*

Period	Number of farms	Number of cows tested	Per cent of cows raised	Reactors		Per cent of cows raised that reacted	Per cent of cows purchased that reacted
				Total number	Per cent of cows tested		
1917 to 1925	36	571	71	176	31	22	54
1925 to 1927	42	722	61	288	40	29	57
1928 to 1930	41	677	61	246	36	29	48
1931 to Apr. 30, 1933	45	867	46	413	48	37	57
All periods	164	2,837	59	1,123	40	29	54

Seventy-three per cent of the cows in herds which were predominantly purebred were raised on the respective farms where tested, compared with 55 per cent of the cows in herds which were predominantly grade. Reactors were proportionately fewer among the purebred herds, especially for cows purchased. Undoubtedly many breeders of purebred cattle purchased cows which had already been tested previous to their own official test. A larger percentage of the cows raised in purebred herds reacted than in the case of grades.

Abortion. None of the farmers included in this survey had tested their herds for Bang's disease or infectious abortion. It was not until 1934 that the Federal Government in cooperation with the states made payments available to voluntary participants as indemnity for cattle that reacted to this disease. An attempt was made in this survey to observe how seriously this disease prevails as a menace to dairymen, and to observe its relation to replacement methods.

The number of untimely births on these 200 farms amounted to 5.2 per cent of the 3366 cows inventoried at the beginning of the year (Table 14). Those which had to be bred more than once amounted to 19.8 per cent and those which failed to breed 3.6 per cent. The prevalence of this disease, as with tuberculosis, is associated with replacement methods. Herds which consisted of only cows raised had comparatively little trouble with premature births and with cows which failed to breed. In general, abortion and breeding troubles were much more serious in herds which depended entirely or in part on purchasing cows for replacements. In the 20 herds which consisted only of purchased cows, the abortion cases amounted to 14.4 per cent of the cows on hand at the beginning of the year, but the difficulty encountered in getting cows bred was slightly less serious than in herds which were only partly replaced by purchase. Undoubtedly many cows in the former group were bred before purchased.

Application and Conclusions

The decision as to whether or not any individual farmer should raise his own replacements should be based on that organization of his en-

tire farm business which will yield the greatest continuous profit to him as the operator.

He should make the most economical use of available resources including: the amount and quality of non-tillable pasture land in relation to crop land, and the convenience of these pastures; the amount and quality of roughage and of by-products such as skim milk which might otherwise be wasted; the available labor supply for milking; the amount and kind of building space; and seasonal competition for land and labor especially in regions where cash crops and other livestock

Table 14. *Relation between methods of replacement and breeding troubles.*

Per cent of herd raised	Number of farms	Number of cows at beginning of year*	Cows bred more than once as per cent of inventory	Cows that failed to breed as per cent of inventory	Premature births as per cent of inventory
None	20	284	18.3	3.9	14.4
1 to 49	43	776	25.6	6.1	6.7
50 to 99	85	1,442	19.9	3.3	4.5
100	52	864	14.8	1.9	2.1
All herds	200	3,366	19.8	3.6	5.2

* Assumed to most nearly represent the total number of cows bred or freshened during the year.

enterprises are adapted. Fewer cows and more cash crops frequently pay better than more cows and fewer cash crops.

Relative values and costs must also be considered. The costs of raising heifers are less variable over a period of years than the price of cows. When the price of cows is relatively high, the advantage of raising heifers over purchasing cows becomes greater, and farmers raise more heifers. When cows are relatively cheap, the price is often less than the cost of raising heifers, and farmers raise too few. All this results in periods of over- and under-production called cycles. A peak in the purchasing price of cows occurs about every 14 to 16 years (Figure 1). The current price of cows is not so important as the probable price at the time a calf reaches productive age. A farmer's decision as to replacement policies is too frequently based on current cow prices. Greater consideration should be given to the probable price when a calf reaches maturity and how the organization of the farm business can be improved.

Because of transportation costs the farm price of milk becomes less as the distance increases from consuming centers. Farmers can keep a cow on about the same amount of feed that is consumed by two average heifers. A farmer who consistently raises replacements may keep fewer cows than he ordinarily would because heifers consume a part of the available roughage, and he thereby reduces his cash income from milk. The relative amount by which he reduces his cash income depends on the unit farm price of milk. Thus, the more remote a farmer is from

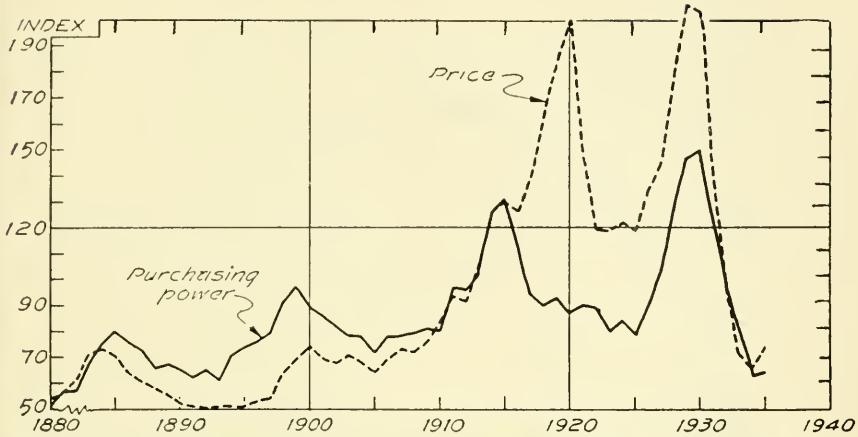

FIGURE 1. *Index numbers of the January 1 farm price of dairy cows and the purchasing power of dairy cows in the United States, 1880-1935.* (1910-14=100.)*

market or from a shipping point, the greater is his comparative advantage in raising heifers. The type and topography of the road from farm to shipping point is also important. A farm located three miles from a railroad and on a hilly dirt road may be at a greater disadvantage than a farm on a good highway, but many times as far from a central market, especially if the former is not situated on a collection route.

According to Dairy Herd Improvement Association records, full maturity in production is not reached until about the sixth year. As shown in Figure 2, heifers freshening at two to three years of age are not expected to produce more than 78 per cent of their ultimate capacity. But during this three or four year period between first freshening and full maturity, the animal is developing in both frame and weight. The feed consumed is performing a dual activity—growing cow and producing milk.

Roughly the costs associated with the stabling, feeding, and milking of the cows are constant for all ages. But because of lower production at the earlier freshening periods and in aged cows, the cost per unit of milk, not including appreciation or depreciation, is greater in the young and the old cows. In the young cows the increase in value is a factor to be balanced against the higher milk cost. A few men with limited roughage and special milk markets may wish to maintain mostly cows in high production and therefore would ordinarily follow the practice of purchasing five-year old cows and disposing of them whenever their production capacity diminishes. On the other hand, some farmers without the advantage of special milk markets would carry their raised heifers to about the third calf freshening period and sell. In such herds, with the exception of the foundation cows, the milkers are

* Farm Economics, No. 89, page 2162, published by the Department of Agricultural Economics and Farm Management, Cornell University, Ithaca, N. Y.

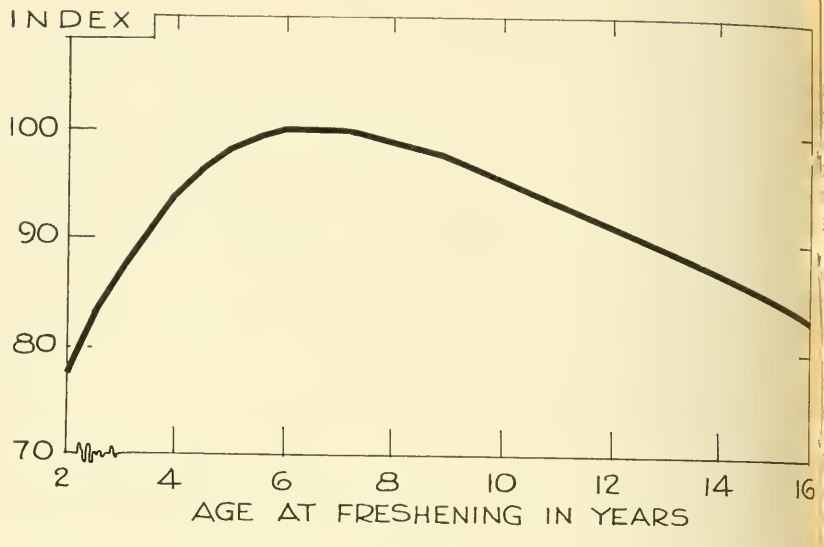

Figure 2. *Index of dairy cow production according to age at time of freshening (1926=100).*

first and second calf heifers. These men would be producing somewhat less milk and at greater cost per unit (not including appreciation) under this management, but by selling cows at the period of greatest value may have a greater net under their conditions.

The men who purchase cows at this period of greatest value are confronted with the reverse situation of depreciation each year. However, if the milk from these cows commands a high price, the cost of depreciation may be relatively unimportant.

Since, in general, production declines after the seventh year, there is a tendency to discard the lower group of producers in each age class each year. In a group of 2535 cows in D. H. I. A. of known ages, less than three per cent of the cows had freshened after the eleventh year, and only about eight per cent after the ninth year.

This culling process is intimately related to the problem of replacements because the heavier the culling the larger the number of replacements. The cost of replacements, the depreciation to be expected, and the price of milk are important factors to be considered in making decisions as to culling.

The value of the cow for slaughter is declining from about the fourth year on, and when beef is high the change in beef value each year is an important part of the depreciation costs. At such times the spread between replacement value and value of the old cow for beef may be large.

Management in the individual herd has an important bearing on culling. Good sound cows well cared for and not forced are likely to remain in production longer. On the other hand, the frequent purchase of inferior stock, presence of disease, and poor handling may use up cows to such an extent that replacement is a very large item in the costs of milk production.

In making these decisions as to culling and making replacements, the profitableness of the whole enterprise is the best approach. Where markets are available for all the milk produced, the net profits may be greater if all animals are near the age of greatest production. The cost due to depreciation of animals as they are culled out of the herd may be larger—may even raise the per unit cost of milk produced—and yet the margin for the whole enterprise may be greater due to the larger quantity of milk at good prices.

On the other hand, due to appreciation in value of cows as compared to the price of milk, another individual farmer may have a greater net for the enterprise as a whole if he milks young cows securing less milk but more than balancing this by greater sales of livestock.

The question of disease was obviously of significant importance in its relation to herd replacement practices, and undoubtedly under existing conditions at the time of this survey many of these farmers were at least partially compensated for their efforts in raising replacements. However, disease problems are of diminishing importance. The state is now virtually free of bovine tuberculosis, and some federal and state indemnities are now available to cooperating dairymen for animals infected with Bang's disease. Competent veterinarians can detect mastitis which may be eliminated from the herd under proper management. But unless farmers in areas of relatively high price milk can be assured of a constant supply of good quality cows free from contagious diseases, they will unquestionably be better off to continue raising at least part of their replacements and milking fewer cows. However, if such assurance could be realized and if farmers in areas of relatively low-priced milk could be assured of a good market for good quality cows at favorable prices, and would raise more cows for sale, there would be economic gain for both groups through some mutual agreement, the amount of that gain at any particular time depending mainly on current cow, milk and feed prices.

Several possible arrangements between groups of farmers might be suggested in bringing about a mutual financial arrangement. An outright purchase plan at current cow prices plus a subsequent bonus for the higher quality cows would be fair to both. Farmers who wish to carry on a breeding program might furnish their own calves and pay some other farmer, who is more advantageously located for raising heifers, an agreed amount for raising them. Farmers in areas of relatively high-price milk might even assist in eradicating contagious disease from the herd from which he might wish to purchase his replacements. Possibly some would prefer a contract price.

Further research is needed to determine the possibilities of raising cows for sale in regions of cheap milk, cheap roughage and cheap pasture on the basis of comparative costs for disease-free high quality cows, and for determining agreements which would be of mutual advantage to both groups of dairymen.

Summary

In general, farmers in southern New Hampshire were raising part or all of their replacements. Sixty-three per cent of the cows on hand at the end of the year were raised on the respective farms where inventoried. Forty-five farmers were raising an excess of heifers as an enterprise in addition to that of milk production. The average of the inventories showed that there were three heifers for each five cows. Based on the average of freshening, 30.3 months, there were virtually enough heifers to replace all cows sold and those that died during the year.

Approximately 30 per cent of the cows inventoried at the end of the year were added during the year, two-thirds by first-calf heifers and only one-third by purchase. Individual records for 70 per cent of these purchased cows show that one-half were purchased from local farmers. Eighteen per cent of the 4450 cows handled during the year were sold, more than one-half of which were sold for productive purposes at an average price of $67. Only 15.6 per cent of the raised cows were sold compared with 22.1 per cent of those purchased.

Farmers stated just why they preferred to raise their replacements. They explained that under current cow prices, it was cheaper to buy cows than to raise them, but that by raising them, the expense of maintenance was less noticeable. They also stated that by raising replacements they knew what they were getting and that disease was less likely.

Feed costs alone (exclusive of pasture and that portion of skim milk which had no sale value) of raising a heifer to the age of freshening averaged $67. This was only $10 more than the average price paid for all cows purchased and only $4 more than that paid for grades.

According to data collected, 38 per cent of the cows sold for production were sold for reasons which would indicate that their ownership was questionable for continued production. Chances of getting satisfactory cows were much greater when buying cows raised rather than those purchased and resold, and also when paying above average price. The important thing is to buy raised cows from farmers who make it their business to raise cows to sell.

The results of the tuberculin test on 164 farms were closely associated with replacement methods. Forty per cent of the cows tested reacted on the first test; 54 per cent of those purchased compared with 29 per cent of those raised. Of the 51 herds which consisted entirely of raised cows, 36 or 69 per cent passed a clean test. The prevalence of abortion, as with tuberculosis, is associated with replacement methods. Herds which consisted only of cows raised had comparatively little trouble with premature births, whereas in herds which were entirely purchased, untimely births amounted to 14.4 per cent of the cows on hand at the beginning of the year.

DAIRY CATTLE INVENTORY—200 FARMS—SOUTHERN NEW HAMPSHIRE

Kind of dairy cattle	Inventory May 1, 1932		Purchases during year		Sales during year				Inventory April 30, 1933	
					Production		Slaughter			
	Number of head	Value $	Number of head	Value $	Number of head	Value $	Number of head	Value $	Number of head	Value $
COWS										
Gr: Raised	1,316	80,000	X	X	174	10,814	133	3,275	1,373	80,658
Purchased	840	51,875	271	19,171	137	7,995	135	3,605	869	51,713
Pb: Raised	778	67,995	X	X	57	5,440	75	2,199	885	77,140
Purchased	432	36,950	102	9,647	46	3,687	45	1,631	465	39,340
Totals	3,366	236,820	373	28,818	414	27,936	388	10,710	3,592	248,851
HEIFERS—1 yr. and over										
Gr: Raised	626	20,460	X	X	32	1,050	8	206	695	22,645
Purchased	11	430	32	845	0	——	1	30	23	625
Pb: Raised	448	21,370	X	X	29	1,750	24	511	530	24,895
Purchased	7	265	30	1,888	0	——	0	——	21	880
Totals	1,092	42,525	62	2,733	61	2,800	33	747	1,269	49,045
HEIFERS—Under 1 yr.										
Gr: Raised	512	7,991	X	X	12	50	2	40	505	7,856
Purchased	3	35	9	100	4	125	0	——	9	150
Pb: Raised	398	9,225	X	X	64	934	0	——	374	8,609
Purchased	5	140	5	82	0	——	0	——	4	75
Totals	918	17,391	14	182	80	1,109	2	40	892	16,690
HERD BULLS										
Gr: Raised	12	495	X	X	2	50	2	90	8	300
Purchased	7	310	7	255	1	30	4	107	10	460
Pb: Raised	40	2,455	X	X	1	25	2	162	42	2,775
Purchased	137	10,905	29	1,649	3	180	28	979	138	11,313
Totals	196	14,165	36	1,904	7	285	36	1,338	198	14,848
BULL CALVES										
Gr: Raised	1	10	X	X	0	——	1	3	5	235
Purchased	1	8	0	—	0	——	0	——	0	——
Pb: Raised	16	255	X	X	19	315	0	——	32	649
Purchased	2	100	7	200	0	——	0	——	6	115
Totals	20	373	7	200	19	315	1	3	43	999
GRAND TOTALS	5,592	311,274	492	33,837	581	32,445	460	12,838	5,994	330,433

Value of veal calves slaughtered was $6,329.

Sep.

PAS
630.72
N532
no.285-305